BACKGROUND OF THE INVENTION

1. Field of the invention

The invention relates generally to the field of surface vehicles engines, and more particularly, to an automotive engines.

2. Description of the related Art

For mobile applications, such as an automobile or truck, it is desirable to use a combustion engine that has the following characteristics:

Actual Multifuel;
More efficient than any other known automobile engine;
Minor pollution than any other known combustion engine;
Positive displacement for easy starting and faster response to power demands;
Automatic motor-brake or free-wheel;
High continuous horsepower density;
Quietness;
Smoothness;
Constant Instantaneous Torque;
Quasi-Constant Brake Torque;
Freedom in configuring the engine in a chassis
High operation security;
Prolonged life cycle; and
Competitive initial cost.

There are currently several types of heat engines for surface vehicles, each with its own theoretical cycle and actual performance. These heat engines include Otto Cycle engine, the Diesel Cycle, Rankine Cycle and Brayton Cycle engine. A brief description of each engine is provided below.

The Otto Cycle engine is an inexpensive internal combustion engine with an open cycle. This engine is widely used to power gasoline automobiles with an actual twenty per cent of average thermal efficiency.

The Diesel Cycle engine is a moderately expensive internal combustion engine with an open cycle. This engine is widely used to power trucks, trains and ships with an actual twenty-five per cent of average energy efficiency.

The Rankine Cycle engine is an expensive external combustion engine with a closed cycle. Is implemented only with turbines. This engine is widely used to power ships with an actual thirty-five per cent of average energy efficiency.

The Brayton Cycle engine is an expensive internal combustion engine with an open cycle. Is implemented only with turbines. This engine, with regenerator, is used to power ships and very heavy vehicles with an actual thirty per cent of average energy efficiency.

The Simplest Brayton-Rankine System is an expensive combination of an aircraft turbojet with a Rankine Engine with recuperative boiler, is used to power fast vessels with an actual fifty per cent of average energy efficiency.

SUMMARY OF THE INVENTION

The above-mentioned desirable characteristics for automobile engines and the near oil world crisis when the oil world demand overcome to crude world production they will make necessary this invention.

An engine is disclosed. According to one embodiment of the present invention, the engine comprises a compressor, a high pressure water separator, a regenerator of latent and sensible heat, two combustors, two expanders, a regenerative catalytic reactor, a steam accumulator, a gasses ejector, a water condenser, a low pressure water separator, a water pump and water cooler. The compressor compresses ambient air and pumping water. The regenerator heating the dry compressed air and the first combustor produces exhaust gasses. The second expander receives the exhaust gases from the first combustor and steam genered by internal cooling, and expands the exhaust mixture of steam and gasses. The compressor may be a water-flooded twin screws machine or a water-flooded scroll apparatus. The expanders may be a dry twin screws machine or a dry scroll apparatus.

The engine of the present invention has many potential mobile power applications, including use in locomotives, the marine industry, tractor, busses and automobiles. The engine of the present invention has all the characteristics desirable for surface vehicle applications.

BRIEF DESCRIPTION OF THE DRAWING

For a more Complete understanding of the present invention, the needs satisfied thereby, and the features and advantages thereof, reference now is made to the following descriptions take concerning the accompanying drawings in which.

Fig. 1 depicts a schematic diagram showing the relations of components parts of this invention.

Fig. 2 depicts a schematic thermodynamic cycle of this invention:
1 to 2 is water-flooded air compression with water pumping.
2 to 3 are recuperative heating.
3 to 4 are a continuous combustion.
4 to 5 are a gasses dry expansion.
5 to 6 are a re-heating for continuous combustion.
6 to 7 are a gasses and steam dry expansion.
7 to 8 are a recuperative catalytic re-heating.
8 to 9 are a regenerative cooling.
9 to 10 is a no recuperative cooling for vapor condensation
10 to 1 are the outlet exhaust gasses to state 1.

Fig. 3 depicts a schematic thermodynamic cycles for this invention:
Dry starting, idle run, transitory run and standard run.

DETAILED DESCRIPTION OF THE INVENTION

This invention used to power automobiles has an actual fifty-five per cent of average thermal efficiency.

This invention is not a Brayton-Rankine System.

This invention is one cycle with one binary fluid in which two fluids is used separate and mixed one superimposed upon and augmenting the performance of the other.

The present invention and their technical advantages may be better understood by referring to Fig. 1.

1-A dry air filter receives ambient air.

2-Clean air is aspired by a rotary water-flooded air compressor of positive displacement by volumetric variation.

3-A water separator receives air and waters at high pressure and low temperature from compressor 2.

4-A regenerator receives air at low temperature and high pressure for recovered latent and sensible heat from water separator 3.

5-A first combustor, in permanent operation, receives air at high temperature and high pressure from regenerator 4.

6-A first rotary dry-air expander of positive displacement by volumetric variation receives hot gasses from combustor 5 and impels compressor 2.

7-A second combustor, in intermittent operation, receives gasses flow from a damper control 19.

8-A second rotary dry-air expander of positive displacement by volumetric variation receives hot steam-gasses, from combustor 7, and impels the power shaft.

9-A regenerative catalytic reactor receives steam-gasses from expander 8 or gasses from damper control 19.

10-A regenerator receives steam-gasses from catalytic reactor 9 at high temperature and low pressure for a recovery of latent and sensible heat from low side regenerator 10.

11-A no regenerative cooler receives vapor-gasses at low temperature and low pressure from ejector 21.

12-A water separator receives gasses and water at low pressure and low temperature from cooler 11.

13-A water filter receives water at low temperature and low pressure from separator 12.

14-A water pump receives clean water at low temperature and low pressure from filter 13.

15-A no recuperative cooler receives clean water at low temperature and medium pressure from pump 14.

16-Clean water is aspired by compressor 2.

17-Compressor 2 discharge air-water at low temperature and high pressure.

18-A damper control receives water at low temperature and high pressure from separator 3.

19-A damper control receives hot gasses at high pressure from expander 6.

20-A Steam Control and thermal accumulator receives steam generated by internal cooling of the expanders 6 and 8.

21-A recuperative ejector receives water at high pressure and low temperature and aspired gasses, vapor and water at low pressure and low temperature from regenerator side 4 and side 10.